



Next stop-Mars

A plasma rocket under development at JSC has the potential to send a crew to Mars. Story on Page 3.



Congressional visit

Congressman Steve Stockman, R-Texas, recently visited with JSC managers at UHCL. Photo on Page 4.

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No. 15

Unisys totes Low trophy to Houston

NASA Administrator Daniel S. Goldin on Tuesday presented the 1994 George M. Low Award to the Unisys Corp., Space Systems Unit, Houston, at the 10th NASA Continual Improvement and Reinvention Conference in Alexandria, Va.

In announcing the selection for NASA's quality and excellence award, Goldin recognized Unisys Space Systems "for its excellent total quality program and as a superior developer and provider of top-notch software, critical to the nation's aeronautics and space program."

Unisys Space Systems supplies software products, services and support to JSC for major programs including space shuttle and space station operations and Mission Control Center upgrades. The 1994 Low honoree also provides software and services for management information systems and flight simulations at NASA's Langley Research Center and performs quality engineering and assurance for NASA's Goddard Space Flight Center.

"This organization has demonstrated outstanding performance in attaining a level of quality management that elicits our esteem and appreciation," said Fred Gregory, NASA associate administrator for safety and mission assurance, who chaired the 1994 Low Award panel of judges.

The George M. Low Award is presented to current NASA suppliers who demonstrate sustained excellence and outstanding achievements in quality management. In 1993, to further support the national effort to achieve quality excellence throughout industry, the Low Award was linked with the Malcolm Baldrige National Quality Award. Applicants for the Low Award must first reach the consensus stage of the Baldrige Award. This is the first Low Award given under the realigned process. Past recipients of this prestigious award include: Honeywell Inc., Space and Strategic Systems; IBM Federal Systems Co.; Thiokol Corp., Space Operations; Grumman Corp., Technical Services Division; Rockwell International; Marotta Scientific Controls Inc.; Lockheed Engineering; and Martin Marietta Manned Space Systems.



JSC Photo by Robert Markowitz

JSC employees and the public get a chance to check out the condition of the Space Shuttle *Columbia* following six months in "dry dock" at Rockwell International's Palmdale, Calif., facility. The shuttle stopped at Ellington Field on its way to Kennedy Space Center in Florida.

Supply ship arrives for Mir crew; research continues

The Progress 227 supply ship to the Russian Mir Space Station arrived Tuesday as two Russians and an American began their fifth week in space.

Progress 227 was launched Sunday evening from the Baikonur Cosmodrome.

The shipment brought a variety of research materials to the orbiting station and its crew, Commander Vladimir Dezhurov, Flight Engineer Gennady Strekalov and U.S. Astronaut and Cosmonaut Researcher Norm Thagard.

The equipment included various kits, logbooks, observation materials, glovebags, greenhouse fixative, and harvesting materials. All of those items are part of the fundamental biology work being done on Mir. Progress also carried a Grab Sample Container that will take air samples in support of the environmental monitoring effort, and blood and urine collection kits for the metabolic research effort.

The crew's activities for the first part of this week focus on the environment on the Mir space station. Thagard also conducted a television broadcast, giving a tour of the station and describing recent activities and accomplishments.

Sunday, the Solid Sorbent Air Sampler was activated. SSAS operates for a 24-hour period gathers data on what chemical elements the crew are exposed to on a long term basis.

Monday, the crew used a grab sample container to take an additional air sample of the station. The sample container is a device that has a small container in a vacuum. The crew member opens the device and draws in an air sample. The grab sample is used to get a measurement of air quality in a specific area of the station at a specific time. Thagard wore a monitor, a small dosimeter badge which is used to check for the presence of formaldehyde in the station which may have been generated from plastics or other material.

Also Monday, Thagard was involved with the Fatigue and Sports Protocol activities. The fatigue portion involves the test subject using bungee cords. The test can involve the number of repetitions a crew member can perform or how long the crew member can hold the cords in one position. The Sports Protocol portion involves running on a treadmill at various speeds for aerobic conditioning.

Tuesday's activities aboard the station were

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Houston stop provides look at first shuttle

One shuttle headed home to Florida from California while engineers worked on three others as the pace of activity quickened in preparation for a trio of launches this summer highlighted by the first mission to dock a shuttle with the Russian Space Station Mir.

Columbia left Palmdale, Calif., on Tuesday morning atop a 747 carrier jet, bound for Kennedy Space Center after a six-month stay in which the oldest shuttle in the fleet underwent extensive maintenance and hardware upgrades. *Columbia* will be launched in late September on the STS-73/United States Microgravity Laboratory-2 mission, a 16-day flight in which seven astronauts will conduct round-the-clock microgravity research in a Spacelab science module.

After a four-hour flight, *Columbia* touched down at Ellington Field to spend the night, landing not far from JSC under brilliant blue skies after making a fly-around of the Clear Lake area. The Shuttle Carrier Aircraft carrying *Columbia* piggy-back was ready to take off as soon as weather would permit the final leg of its journey to Florida.

While *Columbia* made its cross-country trek, technicians continued final work on *Atlantis*, gearing up for its planned launch in June on the STS-71 mission in which *Atlantis* will link-up to the Mir space station in the first of seven such docking flights over the next two years.

Atlantis' five NASA astronauts, led by Commander Robert "Hoot" Gibson, spent Saturday and Sunday at KSC, participating in the Crew Equipment Interface Test, the final inspection of the shuttle's payload bay and much of the equipment that will be used during the historic flight. The two Russian cosmonauts who will be launched on *Atlantis* to replace the current crew aboard the Russian space outpost, Mir 19 Commander Anatoly Solovyev and Flight Engineer Nikolai Budarin, will not arrive at JSC for final training until early May. All seven crewmembers will climb aboard *Atlantis* on the launch pad at KSC in mid-May for a mock countdown test, simulating the final hours before their liftoff to rendezvous with Mir.

Atlantis is scheduled to roll over from the Orbiter Processing Facility to the Vehicle Assembly Bldg. on April 19, one week before its planned trip to Launch Pad 39A for final preflight preparations.

Atlantis is targeted for launch no earlier than June 10, but a final launch date several days beyond that could be established once Russian officials decide on a firm launch date for the Mir's newest science module, Spektr. Tentatively scheduled to be launched on a Russian Proton rocket from the Baikonur Cosmodrome in May, Spektr will carry four solar panels and scientific

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JSC cements partnership with academia, industry

By Mark Diogu

An agreement between JSC, academia and industry was signed last month to help inspire students to explore innovative research and develop high energy cells and batteries.

The Space Act Agreement between JSC, Texas Southern University and Energy Innovations Inc. formed a joint venture to focus on basic and innovative research as well as investigate the socioeconomic and environmental impact of high energy cells and batteries.

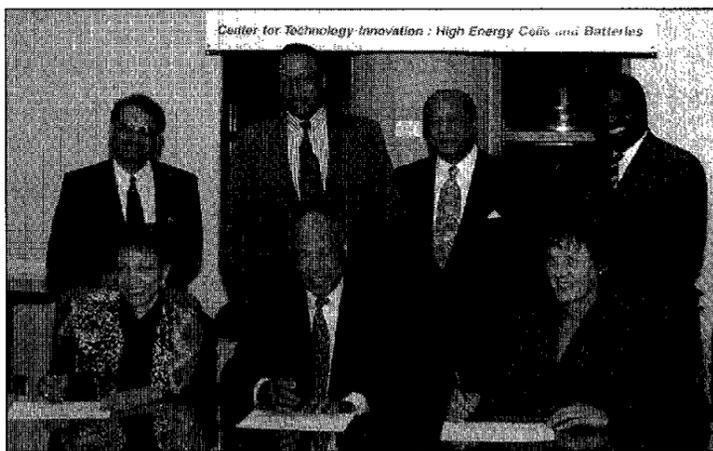
The Center for Technology Innovation: High Energy Cells and Batteries will be located at Texas Southern University's School of Technology and has been funded with a grant from NASA's Minority University Research and Education Program.

JSC Director Dr. Carolyn L.

Huntoon signed the agreement with Dr. Joann Horton, president of Texas Southern University and Dr. Meredith Gourdine, president of Energy Innovations Inc.

This partnership will combine scientific and technical expertise of a historically Black college and university and a small African-American owned company that specializes in energy conversion and environmental control technology. JSC's Power Systems Division will provide assistance to explore and analyze practical applications, environmental impacts and commercialization potential.

The center will focus on the impact of chemical thermodynamics of new materials in harnessing high energy density and high cycle batteries designed to convert chemical and thermal energy directly into electricity.



TSU Photo

A Space Act Agreement between JSC, Texas Southern University and Energy Innovation, Inc. was recently signed at TSU to promote innovative research in energy cells and batteries. Sitting from left to right: Dr. Joann Horton, president of TSU; Dr. Meredith Gourdine, president of Energy Innovations and JSC Director Dr. Carolyn L. Huntoon. Standing from left to right: Dr. Raj Chowdhury, dean of TSU's School of Technology; Hank Davis, director of the JSC Technology Transfer and Commercialization Office; Dr. Joseph Atkinson, director of Minority University Research and Education and Dr. Vernon Clark, provost and senior vice president of TSU.

Bumper-to-bumper information lanes spark traffic plans

The growing use of the information superhighway by just about any home computer enthusiast with a telephone line has contributed to the formation of a new JSC policy for the placement of information on unprotected computers.

Chief Information Officer Jack Garman, who issued the policy in a JSC Announcement that made the policy effective April 1, said the policy applies existing management guidelines on the release of information to this new medium. The only new requirement is for system administrators to receive from the Information Systems Directorate certification of their unprotected computer systems used for the release of NASA internal information.

The policy defines unprotected computer systems as those that allow anonymous or open network access and states that the existing

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JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

Gershwin songs: Celebrate the songs of Gershwin at 8 p.m. April 28 at Clear Lake Presbyterian Church. Tickets cost \$8 for adults and \$5 for students and seniors.

International Festival: Houston International Festival April 20-30. Tickets cost \$3.

JSC Picnic: The JSC picnic April 22 at Astroworld. Tickets cost \$20. Includes all attractions and all-you-can eat barbecue dinner.

Home Tour: Galveston Home tour May 6, 7, 13 or 14. Tickets cost \$13.75.

Ice Skating: World Championship Ice Skating 8 p.m. June 15 at the Summit. Tickets cost \$30.50 for upper prom, \$45.50 for lower prom.

Loving Feelings: Loving Feelings Concert at 7 p.m. Sept. 30 at the Summit. Tickets cost \$32.50.

Seaworld: Seaworld tickets cost \$23.50 for adults and \$16.25 for children 3-11.

Astroworld: Astroworld early bird tickets cost \$14.70. Season passes cost \$45.50.

Six Flags: Six Flags tickets cost \$23.70 for a one day pass, \$31.75 for two day pass and \$20.30 supersaver not valid on weekends in June July and August.

Fiesta Texas: Fiesta Texas tickets cost \$20.35 for adults and \$15.80 for children 4-11 and senior citizens over 55.

Moody Gardens: Discount tickets for two of three different attractions: \$9.50

Space Center Houston: Discount tickets, adult, \$8.75; child (3-11), \$7.10.

Metro tickets: Passes, books and single tickets available.

Movie discounts: General Cinema, \$4.75; AMC Theater, \$4; Loew's Theater, \$4.75.

Stamps: Book of 20, \$6.40.

JSC history: *Suddenly, Tomorrow Came: A History of the Johnson Space Center.* Cost is \$11.

Upcoming events: Schlitterbahn and Splashtown tickets available soon.

JSC

Gilruth Center News

EAA badges: Dependents and spouses may apply for photo identification badges from 7 a.m.-9 p.m. Monday-Friday; and 8 a.m.-4 p.m. Saturdays. Dependents must be between 16 and 23 years old.

Weight safety: Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. April 27 and May 9. Pre-registration is required. Cost is \$5.

Defensive driving: Course is offered from 8:15 a.m.-3 p.m. Saturday. Next class is May 13. Cost is \$19.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays.

Aikido: Martial arts class meets from 5-7 p.m. Tuesdays and Wednesdays. Cost is \$25 per month. New classes begin the first of each month.

Country dancing: Beginners class meets from 7-8:30 p.m. Mondays; intermediate class meets from 8:30-10 p.m. Mondays. Partners are required. For additional information, contact the Gilruth Center at x33345. New class begins April 24.

Ballroom dancing: Ballroom dancing classes. Cost is \$60 per couple. New class begins May 4. For additional information call the Gilruth Center at x33345.

Intercenter run: The Spring Intercenter Run begins April 1 and continues to April 30. Walk or run a 2-mile or 10K course and submit times to the center. T-shirts for participants cost \$2 and must be paid by May 1.

Volleyball league: Registration for volleyball will be held at 7 a.m. April 18 and 19 for mixed leagues, 7 a.m. April 18 for either men's or women's league. For additional information, contact the Gilruth Center at x33345.

Basketball league: Registration for basketball will be held at 7 a.m. April 20 for all men's league and men over 35 league. For additional information, contact the Gilruth Center at x33345.

Fitness program: Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at x30301.

JSC

Swap Shop

Property

Sale: 3-2-2A, new carpet, paint kitchen, CF, deck, assumable \$393/mo; possible trade for equity, \$65k. 992-3662 or 286-3161.

Sale: 22 acres 12k mi out of Seguin, Tx, nice homesite, crops, etc. x37426 or 484-5860.

Rent: Galveston condo, furniture, sleeps 6, Seawall Blvd & 61st St, wkend/wkly/dly rates. Magdi Yassa, 333-4760 or 486-0788.

Sale: San Leon, herb farm, 2.5 acres, 3-2, new 16x80 mobile home, 30x50 green house, 30x30 gar, large pond, fenced. 333-6277 or 339-3562.

Sale: League City, 3-2-2A, new roof/kitchen, large yard, quiet neighborhood, \$71k. x37176 or 554-2487.

Rent: League City, Pecan Forest, 3-2-2, FPL, no pets, very clean, \$795/mo. 554-6200.

Sale: Lot, Walden on Lake Conroe, best offer, owner finance. 488-2652.

Sale: Lot at Toledo Bend, located in Holiday Forest near Hemphill, \$7.5k owner fin. 488-2652.

Rent: Horse barn on 15 acres, 7 stalls, tack room, League City-Dickinson area, \$300/mo. 544-6138.

Sale: Santa Fe/Alta Loma, Ave E., 2.5 acres, 220'x495', \$20k. 337-1311.

Sale: Santa Fe, 3-2-2, Breakfast area, den, pool, 5 or 2.5 acres, satellite. 337-1311.

Lease: League City, Countryside, 3-2-5-2, 1700 sq ft, 2 story, new carpet/paint, big corner lot, \$799/mo + deposit. 326-1390.

Rent: Arkansas Cottage on Blue Mountain Lake, huge stone FPL, porch overlooking lake, \$250/weekly or \$50/dly. Corcoran, x33005 or 334-7531.

Cars & Trucks

'86 Pontiac Fiero GT, black, 50k mi, loaded, garage kept, \$6.5/obo. Matt, x30853 or 488-2585.

'64.5 Mustang, red, 289, looks & runs good, \$3k/obo. 486-0972.

'93 Jeep Cherokee Country, red/gold, 4 dr, 2 WD, pwr windows/brakes/locks, keyless, 6 cyl, 54k mi, ex condition, \$14.5k. Mike, x34383.

'68 Mustang, 2-dr HT, good mech cond, AT, PS, needs body & some interior work, \$2,850/obo. Scott, 282-5455 or 554-2206.

'90 Dodge Colt, 4 spd, hatchback, red, good cond, 45k mi, \$3.5. John, x48050 or 482-7616.

'82 Honda Accord good motor parts 50k mi, \$450; truck trailer stepside, \$150. Ernest, 458-6160.

'83 Nissan Sentra, 5 spd, A/C, liftback, 123k mi, engine rebuilt last year, \$1.3k. 464-8694.

'94 Passport, black, pwr, ex cond, \$19.9k. 992-9430.

'93 Nissan Sentra XE, 4 dr, std, all pwr, cruise, 22k mi, \$9.5k nego. Dilhar, 488-2549 or 480-3233.

'84 Nissan 300ZX Turbo, 5 spd, T-tops, loaded, new A/C & exhaust, ex cond, \$3.4/obo. 333-6224 or 480-1767.

'93 Honda Accord LX, warranty, auto, green, spoiler, low mi, \$13.9k firm. 244-4839 or 334-7238.

'93 Terry "Resort" travel trailer, 29', great shape, \$10.8k. x36478 or 363-1147.

Cycles

'82 Yamaha YZ 80, \$550. 332-9105.

'87 Kawasaki KX 80, \$750. 332-9105.

'79 Yamaha IT 175, very good cond, many new parts, \$475. 337-7633.

Boats & Planes

Hobie Cat 16', sailboat, trailer, mesh trampoline, double trap, extras, \$1,150. 996-5739.

Hobie 18' Catamaran w/sails & trailer, \$1.8k/obo. 474-4742.

'94 Seadoo XP w/cover, heavy duty trailer, vests & access, \$5.5/obo. 333-6610 or 554-8191.

Sovereign, 24', ex cond, extra jib, depth sounder, head, stove, sleeps 4, electric start Johnson OB, recent bottom job, make offer. Mike, 282-2787 or 286-1691.

Stainless steel propellers for Johnson V6 onboards, \$100/ea. 332-9105.

'88 Invader, 210 cuddly cabin, I/O 200 hp Merc, galvanized trailer, loaded, ex cond. 997-6141.

Audiovisual & Computers

Mac II, 8 MB RAM, 130 MB HD, color monitor, mouse, \$700; 286 computer, 1 MB RAM, 40 MB HD, extras, \$200. 996-5739.

Citizen printer, "CSX-140" w/GSX color option, \$225. Magdi Yassa, 333-4760 or 486-0788.

386 DX40, 4 MB memory, VGA video, VGA monitor, 120 MB HD, 3.5 & 5.25 1.10 FD's, \$450. Charles, x36422 or 280-9650.

Sega CDX, 7 games & extras, \$350. x36610.

Microphone, VT-1030 600 ohm unidirectional, \$50, microphone stand, bhk, \$20. David, x40046.

Amiga 500, ext disk drive, HD, monitor, huge software collection, \$1k firm. Scott, 488-4569.

Magna Planer MGI speakers, 1 pr, \$450. x47665 or 471-2934.

Gateway 2000, 486-DX2, 66mgh, 8 MB RAM 128 cache, 340 MB HD, 2 FD's 5.25 3.75, 15" color monitor, software included, Windows, MS-Word, DOS 6.0, \$1,150. M. Rubenstein, 241-0087.

Myst CD ROM game for Macintosh computers, strategy guide book/obo. Ron, x48200.

MacIntoshes, 2 Classic II's, 4/40, \$450; LC 10/40 w/80 MB ext HD & 12" mono monitor, S/W. Joe, 283-4457 or 286-5151.

Color Radius Pivot/LE monitor w/PDS video card for Mac, new \$800 sell \$550. 480-3424

Photography

Meade 4" telescope, model 2045, Schmidt-Cassegrain table tripod & accessory in carrying case, \$500 firm. Marie-France, x39309.

JSC

Dates & Data

Today

Cafeteria menu: Special: baked chicken. Total Health: roast beef au jus. Entrees: deviled crab, baked chicken, beef cannelloni, steamed pollock, Reuben sandwich. Soup: seafood gumbo. Vegetables: seasoned carrots, peas, breaded okra, steamed cauliflower.

Saturday

Easter party: The Employee Activities Association is hosting a children's Easter party from 10 a.m. - noon April 15 at the Gilruth. Tickets cost \$4 for kids, and \$1 for adults. Activities include a magic show, egg hunt, olympics obstacle course, hurricane hollow, dragon moonwalk, ball crawl, roundabout crawl, Easter egg painting, edible arts, face paints and picture with the Easter bunny. For more information call Katie Nguyen at x33185.

Monday

Cafeteria menu: Special: hamburger steak. Total Health: vegetable lasagna. Entrees: beef Burgundy over noodles, barbecue smoked link, vegetable lasagna, steamed fish, French dip sandwich. Soup: chicken and wild rice. Vegetables: buttered corn, steamed spinach, vegetable sticks, navy beans.

Tuesday

Cafeteria menu: Special: turkey and dressing. Total Health: roast turkey. Entrees: barbecue spare ribs, liver and onions, baked chicken, steamed fish French dip sandwich. Soup: black bean and rice. Vegetables: steamed broccoli, California vegetables, breaded squash, savory dressing.

Wednesday

Astronomy seminar: The JSC Astronomy Seminar will meet at noon April 19 in Bldg. 31, Rm. 129. Jim Oberg will discuss "Loose in Baikonur." For more information, call Al Jackson at 333-7679.

Toastmasters meet: The Space-land Toastmasters will meet at 7 a.m. April 19 at House of Prayer Lutheran Church on Bay Area Blvd. For additional information, contact Elaine Trainor, x31034.

Cafeteria menu: Special: Mexican dinner. Total Health: ground turkey tacos. Entrees: beef cannelloni, turkey tacos, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: peas and carrots, ranch beans, mustard greens, Spanish rice.

Thursday

Cafeteria menu: Special: smothered steak. Total Health: steamed pollock. Entrees: chicken and dumplings, corned beef and cabbage, broccoli cheese quiche, steamed fish, French dip sandwich. Soup: navy bean soup. Vegetables: steamed cabbage, cauliflower au gratin, buttered carrots, lima beans.

Friday

Cafeteria menu: Special: baked meatloaf. Total Health: baked potato. Entrees: chicken fajitas, ham steak, pork and beef eggrolls, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: stewed tomatoes, seasoned spinach, cut corn, macaroni and cheese.

April 22

JSC picnic: The Employee Activities Association will host the annual JSC family picnic from 11 a.m.-4 p.m. April 22 at Astroworld. Tickets cost \$20 and include all you can eat barbecue and foot long hotdogs, unlimited soft drinks, ice tea, ice cream, beer, all rides and attractions and a return ticket to Astroworld. Highlights include facepainters, caricature artist, bingo, volleyball, tetherball, tug-o-war, horseshoes and visits with the Looney Tune Characters. For more information call the Exchange Store at x35350.

April 25

Blood drive: Barrios will host its annual blood drive from 8-11 a.m. April 25 at the Barrios Bldg. at 1331 Gemini. For more information call Tom Hanson at 244-7473.

April 26

Astronomy seminar: The JSC Astronomy Seminar will meet at noon April 26 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at 333-7679.

Toastmasters meet: The Space-land Toastmasters will meet at 7 a.m. April 26 at House of Prayer Lutheran Church on Bay Area Blvd. For additional information, contact Elaine Trainor, x31034.

April 27

Blood drive: Lockheed will host its annual blood drive from 8-11:30 a.m. and 1-3:30 p.m. April 27 at the Lockheed Bldg. at 2450 Nasa Road 1. For additional information call Gayle Brown at 333-6514.

May 3

Astronomy seminar: The JSC Astronomy Seminar will meet at noon May 3 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For additional information, call Al Jackson at 333-7679.

Toastmasters meet: The Space-land Toastmasters will meet at 7 a.m. May 3 at House of Prayer Lutheran Church on Bay Area Blvd. For additional information, contact Elaine Trainor, x31034.

May 10

Astronomy seminar: The JSC Astronomy Seminar will meet at noon May 10 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at 333-7679.

Toastmasters meet: The Space-land Toastmasters will meet at 7 a.m. May 10 at House of Prayer Lutheran Church on Bay Area Blvd. For additional information, contact Elaine Trainor, x31034.

Wanted

Want carpoolers from Garden Villas/Hobby airport area. 641-4941.

Want personnel to join van pool from Sugar Land, Southwest Houston to Clear Lake, NASA area. Alice, x35234.

Want personnel to join VPSI van pool, West Loop Park & Ride at 6:30 a.m. to NASA/contractors. Richard Heetderks, x37557 or Ed Rangel, x36124.

Want personnel to join VPSI Vanpool departing Meyerland Park & Ride lot at 7:05 a.m. for JSC, on-site personnel working the 8 a.m. - 4:30 p.m. shift, Travis Moebe, x45765 or Don Pipkins, x35346.

Want clean safe garage apt or living area, CL, have small dog, no furniture needed. Becki, 480-9376.

Want Nanny to care for infant in our Clear Lake home, must have previous experience w/child care, references required. x38614 or 480-4028.

Want low priced school/work car or truck. 271-7011.

Want clothes & toy donations for needed family of 5 all girls, twins age 4, 1yr, new born, mother is sm frame. Bea, x31094 or 409-948-0282.

Want Mickey Mouse cookie jar \$10-\$15 or Mickey Mouse piggy bank, \$5-\$8. Bea, x31094 or 409-948-0182.

Want low priced peripheral or IC cards for Sharp Wizard Oz-9520. Tony, x47401 or 482-4156.

Want lawn mower, self propelled; metal detector, underwater saltwater type preferred, but regular type ok; Jon boat and/or motor. 482-0874.

Want home w/no approval/assumption loan for investment quality purchase. 482-4156.

Want light weight wheel chair in good condition for small stature. x35804 or 474-5610.

Want adult rollerblading gear, helmet, knee & elbow pads, sz 11 footwear, other access. Edward, 481-4889.

Want 3rd roommate to share 3 or 4 bedroom house, Clear Lake, pets okay. Neil or George, 333-8096 or 481-2510.

Want small house, 1 story brick home for elderly lady, near JSC, \$60k range, assumable, owner finance. x40250.

Miscellaneous

Victorian wedding gown, beautifully detailed, off-the-shoulder, fitted to the waist, lovely bursel & long train size 5-6, new \$950 sell \$250. 337-4182.

HEPA air filter for home A/C, 5 ton max, \$75; Gerry booster auto seat, very clean, model #675, \$25. Doug, x48851 or 486-7412.

Ariens riding mower with new engine, \$375; PVC patio furniture, 2 chairs, 2 end tables, love seat/glider, \$150/set or sell individually. 486-4413.

Huffy 10-speed bike, 450/obo; pink umbrella stroller, like new, \$20/obo; toddlers trikes &

wagon, \$5/ea. Ed, 481-4889.

Stained Glass Bifold doors, 60" \$199; ceiling fan, small, brown, \$19; boy's BMX bike, \$35. Mike, x34710.

Aquarium, 20 gal, underground filter, air pump, heater, gravel, accessories, good cond, \$85. 480-3424.

Stair Stepper, Life Style 3000P, \$50; entertainment center, walnut finish, \$35; triple dresser w/wood frame mirror Spragus Carlton, solid maple, \$300; antique seed planters, \$50/ea. 488-2652.

Nordic Track XC ski exerciser with Sanyo pulsemeter, \$225. 474-4011.

New bike wheels, Ultra Lite composite tri-spoke made by Dupont for specialized front & rear cassette wheel, clincher type new \$1,150 sell \$575/both. 464-8694.

Trampoline 6'x12', you pickup and take away, \$50. x30451.

Yazoo 5hp commercial lawn mower, 20" rear wheels, \$350/obo. 996-8020.

Water bed, \$50; full size mattress/box springs, \$20; computer printer, never used, \$35; crab trap, \$20; small bicycle, needs work, \$5; tires & wheels, 14" & 15". 998-7372.

Car jack stands, \$10; fish tanks, stands, 10/30/50; wine bottles, .50/each; garbage cans, plastic, \$5/10; perm air filter, 20x25x1, \$5; B/W video camera, \$95; picture in picture box, \$100; R/C biplane ready to fly w/radio, \$225. 282-3570 or 474-3820.

ICOM-IC HM9 speaker microphone, \$35; Variac 0-140 Vac-10amps, \$50; heavy duty 5' Wilton swivel vise, \$70; electric motors .75 thru 1 hp; circuit breaker box w/breakers, \$30; Craftsman electric edger/trimmer, 1.5 hp gear drive, \$40; 1" SS ball valve w/teflon seat, \$25; 1" Walworth brass gate valve, ex cond, \$25. 921-7212.

Tires, 4 matching, less than 5k mi, ex cond, Goodyear P225/70R14, Eagle-ST, raised white letters, all season, new \$400 sell \$200. 335-1407.

Stand-up bar w/Miller beer light, \$35/both; credenza, \$25. Brian, 380-5430.

2 President & First Lady Charter Gold memberships, \$700/both or \$400/ea. Roger, x31928 or 996-7674.

Misc sized wooden picture frames; wood beaded car seat; original Kronke, turquoise/silver bolo tie, make offer. 334-7258.

Treadmill, DP Pulsestrider 2600, slow walk to fast jog, pulse, heartrate, distance, etc, heavy duty, ex cond, \$200. 337-7633.

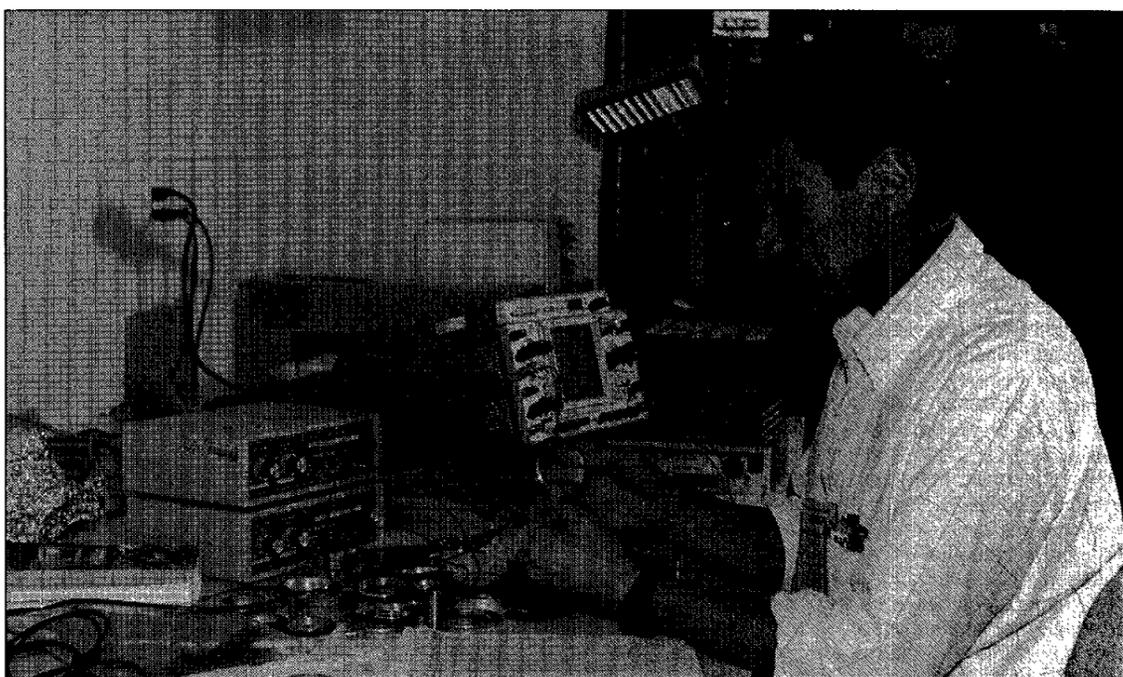
Canon B-70 plain paper fax machine, \$400. Mike, x34383.

In-line skates, Bauer, ladies, size 7 & men's sz 10, good cond, \$20/pair. 538-2696.

Camper top for Nissan short bed, aluminum, white, \$100; O'Brien slalom ski, 70" w/case, \$100; 8 x 10 tent, \$40. x39814.

Continuous Acceleration

Plasma rocket technology developing at JSC could cut travel time to Mars significantly



By Jovan-Justine Love

One of the most revolutionary space propulsion technologies on Earth may be right here at JSC, and these experiments are helping bring the dream of Mars exploration closer to a reality.

The technology is a unique plasma rocket being developed by Dr. Franklin Chang-Díaz, an experimental plasma physicist and NASA astronaut. His experiments are part of the Advanced Space Propulsion Laboratory, now at the Sonny Carter Training Facility.

If successful, a new space vehicle utilizing plasma rocket technology would enable humans to travel to Mars in just two to three months under constant acceleration.

How does it work?

The Exhaust Modulated Plasma Rocket is designed for continuous modulation of the rocket exhaust which ultimately results in shorter transit times to Mars with

reasonable payloads. Patents for the propulsion concept and method of operation were issued to Chang-Díaz in March 1989 and January 1990 respectively.

"The rocket uses a high temperature hydrogen plasma as the working fluid," Chang-Díaz said. "The plasma is very hot—tens of millions of degrees. The hot plasma must be confined and vectored by a powerful magnetic field so that it is never in contact with the walls of the container. It is heated to those temperatures by electromagnetic radiation through strategically located antennas."

The rocket's uniqueness comes from its capability to modulate and adapt its exhaust properties depending on the conditions of flight. It is analogous to how one adjusts the operation of an automobile to travel in a hilly terrain. The automatic transmission of the car enables the engine to exchange torque and wheel revolutions as required depending on the slope of the hill. Spacecraft move in "hilly terrain" also. The hills are the gravitational wells of the Earth, Sun, Moon and Mars. The rocket adjusts thrust and specific impulse to do the best job possible, he said.

These technology developments have been carefully adapted from advances in the controlled thermonuclear fusion programs of the U.S., Europe, Russia and Japan," Chang-Díaz said.

How exactly would humans get to Mars with this technology? In Chang-Díaz' scenario, the mission would proceed as follows:

"A one-way, slow, high-payload capacity, automated cargo ship leaves first and places a habitat, fuel and supplies on Mars," Chang-Díaz said. "Some of the infrastructure such as an operating nuclear power plant on the surface, fuel and redundant landers on Mars orbit, will be located at strategic points on orbit and on the planet's surface. Additionally, a fuel supply will be located on orbit at the edge of the Earth's gravitational sphere of influence."

Next, a low-payload, fast ship will carry a crew to Mars. The ship will pick up its final fuel load for Mars at a staging rendezvous point at the edge of the Earth's sphere of influence. Failure to do so will abort the mission back to Earth. The fast cruise to Mars will be under modulated exhaust at maximum power on a trajectory designed for Mars-orbit insertion. A rendezvous with supplies and the lander at Mars will be required to effect a landing, Chang-Díaz said.

This "split sprint" scenario, as this mission is called, sounds incredibly real. Chang-Díaz and his colleagues Michael Hsu, a graduate student at Cambridge University in England; Ellen Braden and Ivan Johnson of the Engineering Directorate and Ted Yang of Yang Technologies Inc., are developing operational techniques.

"This new, higher thrust engine concept will allow considerably faster travel times to Mars than originally envisioned with conventional rocket propulsion," Johnson said.

A "split-sprint" mission scenario can be accomplished with a one-way, 180-day robotic space-tug precursor mission, followed by a 101-day, low-payload, human fast-boat. After a 30-day stay, the human ship can return to Earth in 104 days. Most

ships with Stanford University, the University of Idaho and the University of Puerto Rico are being explored.

"I am very thankful to all those folks who have made this exciting venture possible here at JSC," Chang-Díaz said. Chang-Díaz and his colleagues have spent more than 12 years in this field trying to find a way to overcome the limits of travel time to Mars. While these science experts work diligently to "reach for the stars," that knowledge will be shared with new young scientists who have similar aspirations. In 1996, doctoral students majoring in physics and engineering will be working in the lab as part of their dissertation thesis research on the first of a series of precursor experiments. According to Chang-Díaz, this patented propulsion system is not being used anywhere else in the world. The technology could ultimately revolutionize the power used in today's aircraft and cars. Our future in space is becoming more and more present with the reality of this experimental rocket, a vehicle that is sure to help us reach for the stars, he said. □

Mars mission scenarios involving conventional engines involve travel times of nine months to a year.

"This speedboat option with the Exhaust-Modulated Plasma Rocket is one of the shortest Mars missions thus far projected," Chang-Díaz said.

The benefits of short human transits include a decrease in physiological problems associated with long-term space travel and a reduction in radiation exposure, while the continuous acceleration provides an artificial gravity of sorts that may have added positive effects. Furthermore, reduced mission duration would put much less of a requirement on the development of long-duration life support facilities and their associated maintenance, Chang-Díaz said.

Another aspect of space travel that has been incorporated into the design consideration of this human mission to Mars is the important feature of an abort capability. Failure of a major system while en route could require return to Earth or, in some cases, use of the destination planet as a "safe haven."

Such abort capabilities were used in project Apollo and exist today in all shuttle missions. Accordingly, interplanetary human missions should also possess such capability, Chang-Díaz said.

Chang-Díaz and his co-workers started this project in the early 1980s at the Massachusetts Institute of Technology. The project grew over the years from a purely theoretical basis to the experimental program it is today.

"At this juncture, it is most appropriate to do the research here in Houston because of our access to the wealth of knowledge in spacecraft design and integration we have here at JSC," Chang-Díaz said.

Chang-Díaz's busy schedule and astronaut training requirements also make it difficult for him to travel to Boston, so having the project here makes all the difference, he said.

This elaborate undertaking has been brought about by a team of key individuals associated with Chang-Díaz and with the help

of upper management and others in the Flight Crew Operations, Engineering and Center Operations Directorates as well as the International Space Station Program, which allocated the floor space required for this facility. Kumar Krischen of the Technology Transfer and Commercialization Office helped with the strategic planning.

"This new space propulsion technology will have a profound effect on the economics of the commercial satellite market by virtue of their greatly improved payload fraction over conventional chemical rockets," Krischen said.

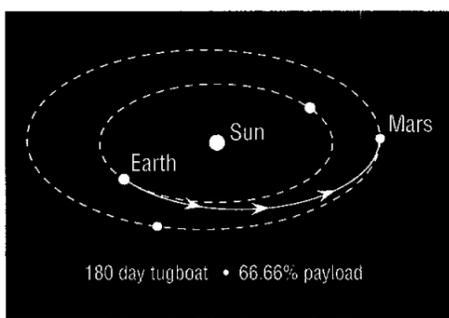
Scientific expertise and resources are being contributed by Alex Ignatiev of the Space Vacuum Epitaxy Center at the University of Houston. In June 1996, a graduate student fellowship plan will begin from an agreement in the works with the Propulsion Research Center of the University of Alabama in Huntsville. Other relationships with Stanford University, the University of Idaho and the University of Puerto Rico are being explored.

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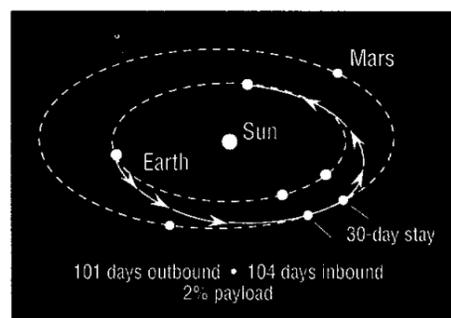
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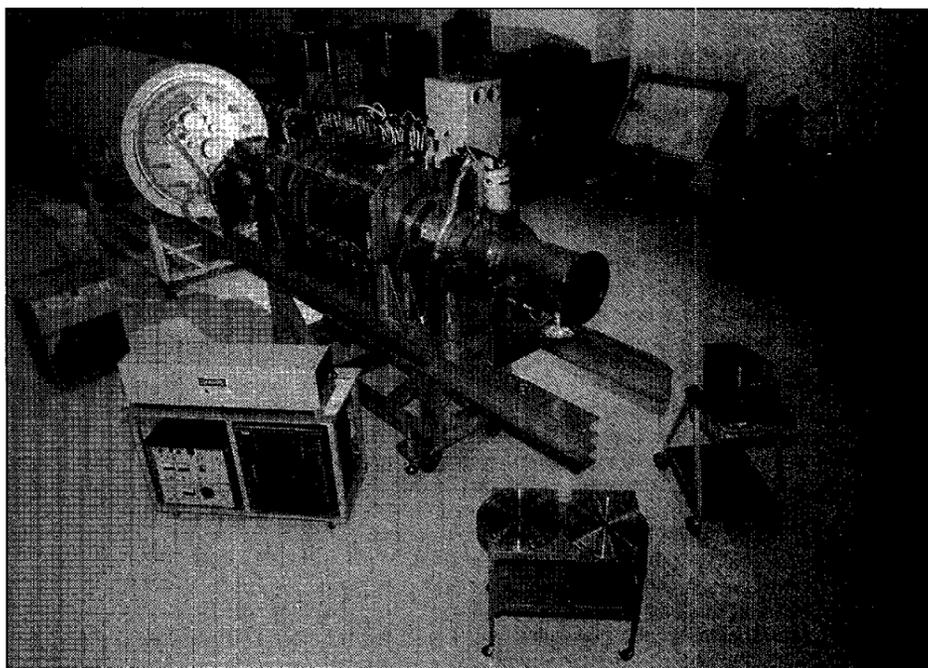
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Cargo ship trajectory



Fast ship trajectory



Top: Chang-Díaz analyzes Plasma Rocket rings at his workstation at the Advanced Space Propulsion Laboratory, now at the Sonny Carter Training Facility. Bottom left: Chang-Díaz works with the rocket drawings. Bottom right: The Plasma rocket uses a

high temperature hydrogen plasma as the working fluid. The plasma is heated by electromagnetic radiation and must be confined. The rocket's uniqueness comes from its capability to modulate and adapt its exhaust properties.

JSC Photos by Robert Markowitz

Employees, contractors earn NASA's highest honors

JSC managers are among the NASA employees who will receive the agency's highest honors in a ceremony to be held at 3 p.m. next Friday in Teague Auditorium.

This year's ceremony will honor individuals and groups nominated by center management to receive the Senior Executive Service's highest awards, the Distinguished Executive Award and the Meritorious Executive Presidential Rank.

Each recipient of a NASA medal also will be presented with a certificate signed by NASA Administrator Daniel S. Goldin. Individuals selected to receive NASA Group Achievement Awards on their team's behalf will receive framed certificates at the ceremony. Certificates for individual participants of teams will be forwarded to the nominating organizations at a later date. Dr. Wayne Little, associate administrator for space flight, will assist JSC Director Dr. Carolyn L. Huntoon in presenting the awards.

The SES Distinguished Executive Award will be presented to JSC

Deputy Director George W.S. Abbey and Mission Operations Director John O'Neill.

The SES Meritorious Executive Award will be presented to Stephen Bales, assistant director for program support in the Mission Operations Directorate; James Costello, manager of the Space Shuttle Program Office; Chief Information Officer John Garman and Steve Hawley, deputy director of Flight Crew Operations.

The NASA Distinguished Service Medal was presented at NASA Headquarters on April 12. Recipients included Astronauts Charles Bolden, John Casper, Franklin Chang-Díaz and Richard Richards.

NASA Outstanding Leadership Medals will go to Mike Baker, Richard Hieb, Ellen Ochoa, Robert Cabana, Tom Jones, Paul Sollock, Joe Fries, Frank Littleton, Jane Stearns, Linda Godwin, John Lottinville, Sidney Gutierrez and Donald McMonagle.

NASA Exceptional Engineering Achievement Medals will be present-

ed to Jose Marmolejo and Eugene Ungar.

NASA Exceptional Service Medal recipients include, Andrew Allen, Robert Gibson, José Rangel, Ralph Anderson, Allan Gist, Dorothy Rasco, Jerome Apt, Wayne Gotsch, Kenneth Reightler, Byron Boeckel, L. Blaine Hammond, Joyce Seriale-Grush, Bobby Bragg, Susan Helms, Gary Sham, Curtis Brown, John Henderson, Paul Stull, Daniel Bursch, Donald Henninger, Pierre Thuot, Tommy Capps, Jewel Hervey, Lewis Wade, Robert Castle, Clifford Hess, Joel Walker, Kevin Chilton, Marsha Ivins, Carl Walz, Edward Chimenti, Catherine Kramer, Doug Ward, James Clement, Mark Lee, Deborah Wetterstroem, Michael Clifford, Martin Lewis, Anne White, Curtis Collins, Nancy Liounis, Peggy Whitson, N. Jan Davis, Carl Meade, Rachel Windham, Charles Gemar, Granvil Pennington and Peter Wisoff.

The NASA Exceptional Achievement Medal award will go to

Elizabeth Bains, Mark Ferring, Cheevon Lau, Kenneth Cameron, Steve Fitzgerald, Larry Shaw, Eric Christiansen, Teresa Gomez, Linda Uljon, Jeanne Lee Crews, Debra Johnson and David Whittle.

The NASA Exceptional Bravery Medal will be awarded to Stephen Feaster, J.D. Loper and Steven Price.

The NASA Public Service Medal will be awarded to Richard Ehret of Rockwell International, Anita Fogtman of Loral Space Information Systems, Natalie Karakulko of TechTrans International, Janet Kovacevich of Hernandez Engineering, Jane Vetter of the University of Houston-Clear Lake and Richard Wien of Eastman Kodak Co.

NASA Group Achievement Awards will be given to Dexterous End Effector Flight Demonstration Development Team, Lidar In-Space Technology Experiment Mission Management Team, NASA Supply Management System, JSC Implementation Team, Orbital

Debris Radar Measurements Team, Remote Manipulator System Position Orientation Hold Submode Flight Software Development Team, Shuttle Plume Impingement Flight Experiment Project Team, Simplified Aid for EVA Rescue Detailed Test Objective Development Team, Space Radar Laboratory-1 and 2 Mission Management Team, Space Station Avionics Facility Support Group STS-51, PC Tube Anomaly Investigation Team and Technical Equipment Upgrade Team Tools for Rendezvous and Docking Team.

The NASA Public Service Group Achievement Award will go to the Information Sharing Protocol Development Team.

Following the ceremony, a reception will be held in the lobby of the auditorium for award recipients and their guests. Supervisors are encouraged to allow employees to attend as their workloads permit. For more information regarding the ceremony, contact Helen Harris at x38413.

Career help available this month

As part of the Career Transition Assistance Program, Human Resources will be offering workshops to JSC civil service employees.

One-day workshops will cover skills assessment, objective setting, job offer evaluation, salary and benefits negotiation, networking, interviewing techniques and resume and cover letter preparation.

All workshops will be held in Bldg. 45. Time and room number are available from Human Resources.

CTAP also will offer use of a Job Assistance Center. The center will house computers, telephones, laser printers, a copier, fax machine, library, and career counselors and will begin operations in the next few weeks. Employees will be required to attend a workshop before using the center.

Employees may sign up for the workshops by calling x34300.

Teacher workshop makes family ties

The Education and Information Services Branch will offer an aerospace education workshop from June 19-23 for elementary school teachers who are family members of JSC civil service and contractor employees.

Workshop activities include hands-on experiments, tours and briefings on a variety of subjects. Participants will receive educational activity guides and videos.

There is a limited number of participants. Applications are due May 5. For information, call x30235.



JSC Photo by Jack Jacob
SPACE SPEAKER—U.S. Rep. Steve Stockman, R-Texas, meets with JSC Deputy Director George Abbey and University of Houston-Clear Lake President Glenn Goerke, left, and Jim Reinhartsen, president of Clear Lake Area Economic Development Foundation, right. Stockman discussed America's space program at a UHCL gathering Monday.

Mir crew celebrates space travel

(Continued from Page 1)

fairly light. The crew spent part of the day getting ready for future work with an incubator experiment and general preparations for the arrival of the Progress module.

The crew and the Russian people celebrated the observance of Cosmonauts Day on Wednesday. The annual occasion marks the anniversary of Yuri Gagarin's flight. Gagarin was the first human to travel into space and was launched on April 12, 1961, in a Vostok capsule atop a booster rocket that was slightly smaller than the one used to launch the Mir 18 crew. There were many special events held throughout Russia and the Mir 18 crew took the day off from most of their normal experiment activities.

Last week, Dezhurov spent 24 hours wearing a monitor that gath-

ered data on his blood pressure and heart rate as part of the continuing effort to establish a baseline condition of the crew members' cardiovascular system. The Mir 18 commander and his two crewmates also were involved in body mass measurements recorded periodically during the flight. They also had blood drawn in support of the metabolic research activities.

Last Friday, the crew had more work time with the Chibis suit, the Russian version of the Lower Body Negative Pressure Unit used on the space shuttle. For this session, Dezhurov was the test subject, with Thagard supporting the experiment. Chibis suit activities are always coordinated to take place during a communication pass so flight controllers on the ground can monitor biomedical telemetry during the experiment.

PSI hosts Secretarial Fair on new technology, trends

JSC's secretarial workers have the chance to hone their skills and learn about new trends in the secretarial field during a "Secretarial Fair" being hosted by the Clear Lake/NASA Area chapter of Professional Secretaries International.

The one-day event will take place from 10 a.m.-2 p.m. April 22 at the Holiday Inn on NASA Road 1. More than 100 secretaries are expected to attend the event which kicks off Professional Secretaries Week.

"The secretarial field is changing rapidly," said Elaine Kemp, president of the Clear Lake/NASA Area PSI chapter. "This event will help secretaries stay current on the newest technologies and trends."

A variety of services and organizations will be at the fair. PSI will be on hand to explain the benefits of PSI membership and the Certified Professional Secretary designation. Information on software trends,

maintaining a professional image, new products and employment opportunities will be available from numerous sources including The Office Team, College of the Mainland, The Training Team, Mary Kay Cosmetics, Executive Reservations Service and Joyce Office Products.

A special one-hour seminar—"The Comma War"—begins at 11 a.m. The course will be taught by Maureen Giacchino of The Training Team and will focus on the correct use of punctuation, particularly commas. Giacchino will present information on the correct usage of commas, the historical changes in usage, and differences in opinion in using this particular punctuation.

Reservations are not required, but tickets must be purchased. Cost is \$5 in advance, or \$6 at the door. Admission to the general fair is free. For additional more information contact Kemp at x30556.

Next launch depends on Spektr

(Continued from Page 1)

equipment to Mir for an automated docking in advance of *Atlantis'* launch. The Mir 18 crew currently aloft, Commander Vladimir Dezhurov, Flight Engineer Gennadiy Strekalov and U.S. astronaut Norm Thagard, will be busy over the next few weeks, moving science modules through the use of a robotic arm and transferring solar panels from the Kristall science module to the Kvant science module on Mir to prepare the space station for *Atlantis'* arrival. Dezhurov and Strekalov plan to conduct four space walks in support of that activity.

If the Spektr launch is delayed,

causing a similar delay to *Atlantis'* launch, NASA managers could elect to launch *Discovery* before *Atlantis* in early June on the STS-70 mission to deploy the newest NASA Tracking and Data Relay Satellite. To meet that schedule, officials here would have to decide by the end of April whether to swap STS-70 and STS-71 so *Discovery* could be hauled to Launch Pad 39B in early May.

Unaffected by other activity is *Endeavour*, being readied for the STS-69 mission in July. Its crew will deploy and retrieve the Wake Shield Facility and a SPARTAN science satellite and two astronauts will conduct a six-hour space walk.

New computer guidelines help protect information on superhighway

(Continued from Page 1)

public information release approval processes must be followed for information placed on unprotected computer systems accessible to the general public.

"Over the past year or two, public access to government information has grown exponentially based on the growth and popularity of the Internet and related interconnections of public networks, and the emergence and availability of powerful and user-friendly information access tools for the Internet such as Mosaic and the World Wide Web," Garman said.

Such tools, however, require the use of anonymous computer ID's without passwords, which makes the computers providing the information completely open to anyone who has access, including anyone using the Internet.

"Coupled with a tremendous growth in NASA information now available on WWW home pages (as

the entry points to the web are called) and similar areas, some very valid concerns are being raised concerning quality, correctness, propriety and cost," Garman said. "The purpose of this policy is to establish an initial benchmark which both satisfies the real needs of the agency to use the power of networks and unprotected servers for its own work and to meet the real and proper process requirements for the public release of NASA and government information."

The authority and process for placing information on unprotected network devices depends on whether it is located on a JSC "private" or "public" network segment or branch. A private branch is simply a branch located behind network "routers" programmed to prevent public access or where the information is protected by the system.

Information placed on servers located on private branches requires only normal management processes for internal release of information.

There are three major classifications for information that may be released to the public: public affairs, scientific and technical, and management.

Information on JSC's programs, facilities, flight events, and personnel intended for release to the news media, the general public, or for educational purposes, is considered public affairs related. Permission to release such information rests with the JSC Acting Director of Public Affairs Jeff Carr and his staff. The primary contact is Kelly Humphries of the Education and Information Services Branch, AP2, x45050.

Information intended for release as a NASA technical publication or as a professional journal article or presentation is considered scientific and technical. An approved JSC Form 548 and FF Form 427 are required for release of this type of information. The primary contact is Lynn Buquo of the ISD Information Services Division, PS2, x34716.

Information on organization, personnel, budget, acquisition, technology commercialization, equal opportunity, and other topics is considered management information. Authority for release is given by the cognizant director, program or project manager, or center staff office chief.

"This policy continues the concept of only normal management controls for information on any system with protection," Garman said. The new policy also institutes some guidelines for what must be included when placing information on network devices.

All unprotected computer devices to be used for "private" information as defined in the policy must be registered and certified by filling out a form at the WWW address: <http://www.jsc.nasa.gov/jsc/internal/register/>. For more information, contact ISD's Daniel McCoy at x30950.

Not all information on a JSC network can be accessed from the Internet. Special network processors

called routers are used to control and filter the flow of information within and outside the center. In fact, JSC has coined the terms "green," "amber," and "red" to describe three levels of network access. Devices on the green network can access and be accessed by anyone on the Internet (effectively "the world"). Devices on the amber network can access anything on the Internet, but can only be accessed by devices within the "nasa.gov" network domain (which includes all NASA Centers and some close and on-site contractors). Items on the red network have even higher security isolation. Green networks are considered "public" and red or amber networks are considered "private."

To be classified as private, a network must be certified by ISD as a system protected by the network at the amber level or by system software that protects the system at a level equivalent to the network amber level.